REMARKS

Status of the Claims

Claims 19, 20, 23-28, 30-38, and 44-57 are pending in the present application, Claims 46-57 having been added in the present amendment, Claims 29 and 39-43 having been canceled in the present amendment, and Claims 1-18 and 21-22 having been previously canceled. Claims 19, 30 and 31 have been amended to more clearly define the invention.

Claim 38

The Examiner has indicated that Claim 38 has been withdrawn for being directed to a non-elected species, and that there is no generic linking claim allowed.

As discussed in detail below, applicants believe that Claim 19 is a novel generic claim, such that Claim 38 should be rejoined.

Amendment to the Drawings

The Examiner has identified informalities associated with the originally filed drawings. Applicants have submitted concurrently herewith drawings correcting these deficiencies. No new matter has been introduced.

Processors and Functional Language

Several of applicants' claims recite structures (i.e., analyzers/processors/controllers) configured to implement a specified function. Several rejections appear to be based on the position that all processors/controllers are equivalent, regardless of what function a processor/controller is implementing. Such rejections appear to conclude that a Controller A implementing a Function X is equivalent to a Controller B implementing a Function Y, even if Function X is not equivalent to Function Y.

Applicants respectfully submit that analyzers/processors/controllers recited in an apparatus or system claim are ***structurally*** distinguishable from prior art analyzers/processors/controllers, if the recited structure implements a function not disclosed by the prior art.

Consider that in the software arts, issued software patents routinely include novel method claims, and *novel apparatus claims defining a prior art computer system programmed to implement the novel method*. The novelty of the apparatus claim routinely relies on the novel method implemented by a generic computer.

Further, MPEP 2173.05(g) clearly states that functional language can be used in apparatus and

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system claims. Thus, the recited function implemented by applicants recited analyzers/processors/controllers must be considered to be an element of the claim, and the claim must be allowed if the prior art does not teach or suggest an equivalent element.

If the Examiner believes that applicants are incorrect with respect to this issue, applicants respectfully request that the Examiner discuss this issue with Supervisory Examiners; and, if the conclusion of such discussions support the Examiner's position, to provide some basis articulated in the MPEP that supports the position that a Controller A implementing a Function X is structurally equivalent to a Controller B implementing a Function Y, even if Function X is not equivalent to Function Y.

Claims Rejected Under 35 U.S.C. § 102

The Examiner has rejected Claims 19, 23-28, and 44-45 as being anticipated by Ogino (U.S. Patent No. 5,436,717). Applicants respectfully disagree for the following reasons.

In the interest of reducing the complexity of the issues for the Examiner to consider in this response, the following discussion focuses on independent Claims 19 and 44. The patentability of each remaining dependent claim is not necessarily separately addressed in detail. However, applicants' decision not to discuss the differences between the cited art and each dependent claim should not be considered as an admission that applicants concur with the Examiner's conclusion that these dependent claims are not patentable over the disclosure in the cited references. Similarly, applicants' decision not to discuss differences between the prior art and every claim element, or every comment made by the Examiner, should not be considered as an admission that applicants concur with the Examiner's interpretation and assertions regarding those claims. Indeed, applicants believe that all of the dependent claims patentably distinguish over the references cited. In any event, a specific traverse of the rejection of each dependent claim is not required, since dependent claims are patentable for at least the same reasons as the independent claims from which the dependent claims ultimately depend.

Patentability of Independent Claim 19

Claim 19 has been amended to recite the following structure originally recited in Claim 29:

means to control an amount of stain in solution in the flow cell to an extent desired without undesirably reducing an amount of stain that is bound to the pulp fiber sample

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With respect to Claim 29, the Examiner has asserted that Cubbage et al. (U.S. Patent No. 5,582,982) discloses equivalent means. Applicants respectfully disagree that Cubbage teaches or suggests *means to control an amount of stain in solution in the flow cell.*

Applicants do agree that the system described by Cubbage and applicants' claimed apparatus share the goal of reducing an amount of background fluorescence. However, Cubbage and applicants employ different techniques to achieve that goal, and the techniques (and the structures required to implement those techniques) are simply not equivalent.

Cubbage reduces background fluorescence by utilizing a *light absorbing moiety* that absorbs background fluorescence. Applicants reduce background fluorescence by removing excess stain from the solution (such that most of the remaining stain is attached to the pulp fibers). In other words (applying Cubbage's technique to applicants' apparatus), Cubbage's technique does not remove the excess stain (i.e., the stain is not bound to the wood pulp); rather, Cubbage's technique adds an additional material (the *light absorbing moiety*), and the additional material preferentially absorbs (for reasons not clearly described by Cubbage) fluorescence emitted by the unbound stain, while absorbing relatively less fluorescence from the stain bound to the wood pulp (recognizing that in Cubbage's technique, the desired fluorescence is not a stain bound to wood pulp, but a fluorescent probe preferentially bound to a portion of a biological entity).

Significantly, applicants' *means to control an amount of stain in solution in the flow cell* introduces the bleach into the slurry containing the stained pulp fibers just before the slurry is directed into the sample volume. The bleach quickly oxidizes the stain in solution, but the bleach is not in contact with the fibers long enough to substantially oxidize the stain bound to the fibers. If the bleach was added to the slurry, and the slurry was stored before injecting the slurry into the sample volume, the bleach would oxidize not only the stain in solution, but the stain bound to the fibers. The longer the bleached slurry was held in such a chamber, a greater amount of the stain attached to the fibers would be oxidized (and thus be unavailable for fluorescent analysis). Thus, applicants' *means to control an amount of stain in solution in the flow cell* is configured to introduce a bleaching agent into the slurry just before the slurry enters the sample volume, to provide enough time for the bleaching agent to oxidize the stain in solution (which otherwise would interfere with obtaining data corresponding to the fibers), but not much of the stain attached to the fibers.

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Thus, Cubbage does not teach or suggest *means to control an amount of stain in solution*, as Cubbage simply adds an agent that absorbs the light emitted by the stain to reduce background fluorescence, as opposed to removing the stain itself (i.e., controlling an amount of stain).

Because Cubbage does not teach or suggest an equivalent means, the combination of references cited by the Examiner cannot achieve an equivalent to the apparatus recited by applicants in Claim 19 as amended.

Further, applicants respectfully submit that modifying Cubbage to control an amount of the stain as opposed to absorbing light from the stain while the amount of stain remains constant would represent an impermissible modification of a reference, as described in MPEP 2143.01 (which specifically provides that "if the proposed modification or combination of the prior art would change the *principle of operation* of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious"). Cubbage's principle of operation is the absorbance of undesired fluorescence, while applicants' principle of operation is to control an amount of stain present that can fluoresce. In Cubbage's technique, background fluorescence is produced and then absorbed, while in applicants' technique, the source of the background fluorescence is controlled/reduced, such that little background fluorescence is even produced.

Since dependent claims inherently include all of the recitation of the independent claim on which they ultimately depend, for at least the same reasons as noted above in connection with independent Claim 19, the rejection of dependent Claims 23-28 should also be withdrawn.

Patentability of Independent Claim 44

Claim 44 recites the following structure, which is not taught or suggested by the cited art:

a fluorescence analyzer positioned to analyze fluorescence emitting from the pulp fiber sample, the fluorescence analyzer comprising a controller configured to determine at least one property of the pulp fiber sample

While the references cited by the Examiner do indeed disclose controllers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a controller configured to use fluorescent data to determine a property of wood pulp.

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As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses controllers, but not a controller configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 44.

Since dependent claims inherently include all of the recitation of the independent claim on which they ultimately depend, for at least the same reasons as noted above in connection with independent Claim 44, the rejection of dependent Claim 45 should also be withdrawn.

Patentability of Dependent Claim 27

Claim 27 recites the following structure, which is not taught or suggested by the cited art:

the fluorescence analyzer is configured to determine both a fiber geometry and a lignin content of the pulp fiber sample.

While the references cited by the Examiner do indeed disclose fluorescence analyzers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a fluorescence analyzer configured to use fluorescent data to determine *both a fiber geometry and a lignin content of the pulp fiber sample.*

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 27.

Patentability of Dependent Claim 28

Claim 28 recites the following structure, which is not taught or suggest by the cited art:

the fluorescence analyzer is configured to determine a fiber geometry, a total charge of the fiber, and a lignin content of the pulp fiber sample.

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While the references cited by the Examiner do indeed disclose fluorescence analyzers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a fluorescence analyzer configured to use fluorescent data to determine *a fiber geometry, a total charge of the fiber, and a lignin content of the pulp fiber sample.*

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 28.

Patentability of Dependent Claim 45

Claim 45 recites the following structure, which is not taught or suggested by the cited art:

the controller is configured to determine a lignin content of the pulp fiber sample

While the references cited by the Examiner do indeed disclose controllers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a controller configured to use fluorescent data to determine *a lignin content of the pulp fiber sample.*

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses controllers, but not a controller configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 45.

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Claims Rejected Under 35 U.S.C. § 103

The Examiner has rejected Claim 20 as being obvious over Ogino (U.S. Patent No. 5,436,717) in view of Ogino (U.S. Patent No. 5,428,441).

The Examiner has rejected Claims 29-31 as being obvious over Ogino (U.S. Patent No. 5,436,717) in view of Cubbage (U.S. Patent No. 5,582,982) and Ferrari (U.S. Patent No. 3,065,148).

The Examiner has rejected Claim 32-37 as being obvious over Ogino (U.S. Patent No. 5,436,717) in view of Helm (U.S. Patent No. 4,172,524).

Applicants respectfully disagree for the following reasons.

Patentability of Independent Claim 19

As discussed in detail above, Claim 19 has been amended to distinguish over the references cited by the Examiner, individually and in combination. None of the references teach or suggest the following structure:

means to control an amount of stain in solution in the flow cell to an extent desired without undesirably reducing an amount of stain that is bound to the pulp fiber sample

Since dependent claims inherently include all of the recitation of the independent claim on which they ultimately depend, for at least the same reasons as noted above in connection with independent Claim 19, the rejection of dependent Claims 20, 29-31, and 32-37 should also be withdrawn.

Patentability of Dependent Claims 27, 28 and 45

As discussed in detail above, Claims 27, 28, and 45 recite processing structures that implement functions not disclosed by the cited art, and therefore distinguish over the references cited by the Examiner, individually and in combination.

Patentability of Dependent Claims 30 and 31

Dependent Claims 30 and 31 further define the *means to control an amount of stain in solution in the flow cell* as comprising at least a volume of bleach coupled to the flow cell, such that bleach can enter the flow cell.

While the cited art does include fluid volumes configured to supply a fluid to a flow cell, the cited art simply does not teach or suggest an apparatus that includes ***a fluid volume containing bleach*** that is coupled in fluid communication with a flow cell. An apparatus comprising a generic

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fluid volume is not equivalent, unless the reference teaches or suggests filling such a generic fluid volume with bleach. Applicants' Claims 30 and 31 define an apparatus that must include bleach. The cited art simply does not teach or suggest an apparatus configured to detect and analyze fluorescence from a flow cell containing a quantity of bleach.

Patentability of Dependent Claim 35

Claim 35 recites the following structure, which is not taught or suggested by the cited art; a fluorescence analyzer configured to implement the steps of:

multiplying the first and second images by a vignette correction image that flattens a field and calibrates a color sensitivity of each of the first and second cameras to achieve a calibrated image;

applying a binary threshold to the calibrated image to determine a number of bright pixels in the calibrated image; and

determining if the number of bright pixels indicates that the calibrated image includes a fiber, such that images not including a fiber are discarded, while images including a fiber are further processed.

While the references cited by the Examiner do indeed disclose fluorescence analyzers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a fluorescence analyzer configured to manipulate fluorescent data using the recited functions.

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 35.

Patentability of Dependent Claim 36

Claim 36 recites the following structure, which is not taught or suggested by the cited art; a fluorescence analyzer configured to implement the steps of:

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subtracting a dark-current image from the first and second images to generate a corrected image;

performing a background estimation using a low pass filter;

subtracting the background estimation from the corrected image to achieve a filtered image including fibers and noise;

applying a threshold to locate the fibers in the filtered image; and

quantifying mean intensities for the first and second wavelengths, perimeters of the fibers that were located, and an area of the fibers.

While the references cited by the Examiner do indeed disclose fluorescence analyzers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a fluorescence analyzer configured to manipulate fluorescent data using the recited functions.

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 36.

Patentability of Dependent Claim 37

Claim 37 recites the following structure, which is not taught or suggested by the cited art; a fluorescence analyzer configured to:

process images including a fiber by calculating kink and curl indices of the fibers that were located

While the references cited by the Examiner do indeed disclose fluorescence analyzers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a fluorescence analyzer configured to *calculate kink and curl indices of the fibers*.

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As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 37.

Patentability of Dependent Claim 38

Claim 38 recites the following structure, which is not taught or suggested by the cited art; a fluorescence analyzer configured to:

process images including a fiber by identifying endpoints for each fiber located, and discarding data corresponding to any fiber located that includes more than two endpoints

While the references cited by the Examiner do indeed disclose fluorescence analyzers configured to determine properties of blood (Ogino '717), urine (Ogino '717), cells (Ogino '441), microorganisms (Ogino '441), and target molecules in biological cells (Cubbage) using fluorescent data, the cited art does not teach or suggest a fluorescence analyzer configured to *identify endpoints for each fiber located, and discard data corresponding to any fiber located that includes more than two endpoints*.

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 38.

Patentability of New Claim 46

New Claim 46 is based on Claim 19, and in place of the fluorescence analyzer recited in Claim 19, Claim 46 recites *means to analyze fluorescence emitted from the pulp fiber sample to determine at least one property of the pulp fiber sample*. The means plus function language requires

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the function of determining the property of the pulp fiber sample to be treated as an element of the claim. The cited art does not teach or suggest an apparatus including an equivalent means.

Patentability of New Claim 47

New Claim 47 is based on Claim 46, and further recites that the *means to analyze fluorescence emitting from the pulp fiber sample to determine at least one property of the pulp fiber sample* comprises *means to determine both a fiber geometry and a lignin content of the pulp fiber sample*. The cited art does not teach or suggest an apparatus including an equivalent means.

Patentability of New Claim 48

New Claim 48 is based on Claim 46, and further recites that the *means to analyze fluorescence emitting from the pulp fiber sample to determine at least one property of the pulp fiber sample* comprises *means to determine a fiber geometry, a total charge of the fiber, and a lignin content of the pulp fiber sample*. The cited art does not teach or suggest an apparatus including an equivalent means.

Patentability of New Claim 49

New Claim 49 is based on Claim 46, and further recites that the *means to analyze fluorescence emitting from the pulp fiber sample to determine at least one property of the pulp fiber sample* comprises *means to process first and second images of the pulp fiber sample by implementing the following functions*:

multiplying the first and second images by a vignette correction image that flattens a field and calibrates a color sensitivity of each of the first and second cameras to achieve a calibrated image;

applying a binary threshold to the calibrated image to determine a number of bright pixels in the calibrated image; and

determining if the number of bright pixels indicates that the calibrated image includes a fiber, such that images not including a fiber are discarded, while images including a fiber are further processed.

The cited art does not teach or suggest an apparatus including an equivalent means.

Patentability of New Claim 50

New Claim 50 is generally based on Claim 23, and further defines the structural relationship between the fluorescence excitation light source, the first dichroic mirror, the flow cell including the

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sample in which fluorescence will be stimulated, and the detector for measuring the fluorescence. Claim 50 recites:

a first dichroic mirror configured to both direct light from the light source to the pulp fiber sample in the flow cell and to enable fluorescence from the pulp fiber sample in the flow cell to pass through the first dichroic mirror before reaching the first detector, the first dichroic mirror being spaced apart from the transparent wall along a substantially straight image path that is substantially perpendicular to a beam of light emitted by the light source; the first dichroic mirror being disposed between the flow cell and the first detector

Significantly, while Ogino discloses a fluorescence excitation light source and a first dichroic mirror that directs fluorescence excitation light to the flow cell, none of the configurations disclosed by the cited art are configured such that the fluorescence from the flow cell passes through the first dichroic mirror (i.e., the same mirror used to direct light from the fluorescence excitation light source to the flow cell) before reaching the detector. For example, in FIGURE 8 of Ogino '717, light from fluorescence excitation light source (18) is directed by first dichroic mirror (46) toward flow cell (16). However, fluorescence from flow cell (16) does not pass through first dichroic mirror (46) to reach any detector. Instead, fluorescence from flow cell (16) passes through one or more additional dichroic mirrors (28, 30, or 48) before reaching a detector.

The cited art does not teach the recited configuration, and there appears to be no reason to modify the cited art to achieve an equivalent configuration, absent the impermissible application of hindsight.

Patentability of New Claim 51

New Claim 50 is generally based on Claim 23, and further defines the structural relationship between the dichroic mirror disposed to direct stimulated light (i.e., fluorescence) from the sample and the detectors. Claim 50 recites:

*a dichroic mirror configured to split the **stimulated light** into a first portion and a second portion*

Significantly, while Ogino discloses a fluorescence excitation light source and a dichroic mirror that directs light from a sample volume toward a detector, it must be noted that Ogino's dichroic mirror 28 is designed to separate *scattered light* (i.e., light that is not due to fluorescence,

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light that is not stimulated light) from *stimulated light* (i.e., fluorescence) and from light passing through the flow cell.

Ogino's device includes two light sources, one configured to illuminate the sample (source 18) and one configured to induce fluorescence (source 10). Ogino's device includes three detectors, one for stimulated light (i.e., fluorescence; detector 38), one for scattered light (detector 34), and one for non scattered light passing through the sample volume/flow cell (line sensor 36). Dichroic mirror 28 separates scattered light from the *stimulated light* (i.e., fluorescence) and from light passing through the flow cell. Note that Ogino specifically discloses that source 18 in an infrared source (i.e., emitting light over 750 nm), and that dichroic filter 28 separates excitation light at 488 nm from the stimulated light having higher wavelengths (see Ogino FIG 5 and the description of FIG 4). As IR light is also in excess of 488 nm, the IR light will pass through dichroic mirror 28 along with the stimulated light. Dichroic mirror 30 separates IR light passing through the sample volume from the *stimulated light* (i.e., fluorescence), as shown in FIG 6 and described in the text associated with FIG 4. Thus, Ogino explicitly teaches that only a single detector is employed to receive *stimulated light* (i.e., fluorescence). Ogino's second embodiment (i.e., FIG 8, is based on FIG 4, and includes an additional detector (a video camera), but only a single detector for *stimulated light* (i.e., fluorescence).

Significantly, neither the cited art (Ogino and the balance of the references) nor the knowledge generally available in the art appear to teach or suggest that it would be desirable or beneficial to employ two different detectors to acquire different portions of stimulated light (i.e., fluorescence) when collecting fluorescence data from a fiber sample. Note that in the example provided by applicants (see paragraph [[023]]), a single stain is applied to the fiber sample. If two different stains having different fluorescence spectrums were employed, then an artisan of ordinary skill might have been lead to employ two different detectors to collect the fluorescence data, but that is not the case with applicants' technology, and there appears to be no reason, other than hindsight, to modify Ogino's device to analyze a fiber sample, in order to achieve an equivalent to the apparatus of Claim 51.

Significantly, the prior art references dealing with fluorescence analysis of pulp fibers (i.e., Renard, Berthold, Visuri, and Jeffers) induce fluorescence of the fiber lignin using UV (biomolecules are known to fluoresce in response to UV stimulation, and lignin in particular emits light centered at

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about 410 nm when it fluoresces; see FIG 4 in the newly cited reference (entitled VARIATION OF THE UV-TO-BLUE FLUORESCENCE RATIO FOR ORGANIC MATTER IN WATER UNDER CONDITIONS OF FLUORESCENCE SATURATION), and the resulting fluorescence is collected using a ***single*** detector (Berthold discloses a second detector that is configured to receive reference light from the excitation source, thus Berthold's second detector does not receive stimulated light (i.e., fluorescence)). Thus, the art most closely related to the analysis of pulp fibers does not employ the technique of splitting the stimulated light (i.e., fluorescence) from ***stained*** pulp fibers into different portions, and detecting the different portions using different detectors.

The cited art does not teach the recited configuration, and there appears to be no reason to modify the cited art to achieve an equivalent configuration, absent the impermissible application of hindsight.

Claim 51 further recites,

a fluorescence analyzer configured to analyze data from the first and second detectors corresponding to fluorescence emitted from the stained pulp fiber sample and measure at least one property of the pulp fiber sample

In other words, the analyzer uses fluorescence data from two different detectors. As noted above, Ogino explicitly teaches that only a single detector is employed to receive *stimulated light* (i.e., fluorescence).

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to implement an equivalent function.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 51.

Patentability of New Claim 52

New Claim 52 is dependent upon new Claim 51, and is patentable for at least the same reasons. Claim 52 further defines the fluorescence analyzer, and recites that: *the fluorescence analyzer is configured to extract a particle fluorescence ratio from data provided by the first and*

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second detectors. This aspect of the invention is clearly disclosed by FIG 3 and the corresponding text.

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to *extract a particle fluorescence ratio from data provided by the first and second detectors*.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 52.

Patentability of New Claim 53

New Claim 53 is dependent upon new Claim 51, and is patentable for at least the same reasons. Claim 53 further defines the fluorescence analyzer, and recites that: *the fluorescence analyzer is configured to utilize data provided by the first detector to apply a correction to data provided by the second detector*. This aspect of the invention is clearly disclosed in paragraph [0026].

As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to *utilize data provided by the first detector to apply a correction to data provided by the second detector*.

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 53.

Patentability of New Claim 54

New Claim 54 is dependent upon new Claim 53, and is patentable for at least the same reasons. Claim 54 further defines the fluorescence analyzer, and recites that: *the fluorescence analyzer is configured to utilize corrected data provided by the second detector to measure the at least one property of the pulp fiber sample*. This aspect of the invention is clearly disclosed in paragraph [0026].

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As discussed in detail above, it is applicants' understanding that a Controller A implementing a Function X is ***NOT*** equivalent to a Controller B implementing a Function Y, where Function X is ***NOT*** equivalent to Function Y. The cited art clearly discloses fluorescence analyzers, but not a fluorescence analyzer configured to *utilize corrected data provided by the second detector to measure the at least one property of the pulp fiber sample.*

Because the cited art does not teach or suggest an equivalent function, none of the references cited by the Examiner, individually or in combination, can achieve an equivalent to the apparatus recited by applicants in Claim 54.

Patentability of New Claim 55

New Claim 55 is dependent upon new Claim 51, and is patentable for at least the same reasons. Claim 55 further defines the dichroic mirror and the detectors, and recites that: *the dichroic mirror is centered at about 580 nanometers, the first detector is configured to acquire data for light ranging from about 510 nm to about 570 nm, and the second detector is configured to acquire data for light ranging from about 590 nm to about 680 nm.* This aspect of the invention is clearly disclosed in paragraph [0023]. Note these spectral parameters are configured to collect data from pulp fiber samples stained with Acridine Orange.

As discussed in detail above with respect to the patentability of Claim 51, Ogino does not teach or suggest a dichroic mirror that splits the stimulated light (i.e., the fluorescence) into different portions. While dichroic filters of different parameters are known, Ogino simply does not teach or suggest any benefit that would be obtained by using different detectors for different portions of the stimulated light when analyzing fiber samples. Significantly, the prior art references dealing with fluorescence analysis of pulp fibers (i.e., Renard, Berthhold, Visuri, and Jeffers) induce fluorescence of the fiber lignin using UV (biomolecules are known to fluoresce in response to UV stimulation), and the resulting fluorescence is collected using a single detector. These references do not teach or suggest staining fiber pulp samples with Acridine Orange, which is conventionally employed as a nucleic acid selective fluorescent cationic dye useful for cell cycle determination. As the cited art does not appear to teach or suggest using Acridine Orange for the analysis of pulp fiber samples, there appears to be no reason other than hindsight to modify Ogino to detect fluorescence from Acridine Orange, particularly where different portions of such fluorescence are detected in two different detectors.

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Thus, the modifications required to Ogino to achieve an equivalent structure appear to be based on hindsight, rather than to solve a problem recognized in the art, or to obtain some recognized benefit or functionality.

Patentability of New Claim 56

New Claim 56 is dependent upon new Claim 51, and is patentable for at least the same reasons. Claim 56 further recites *a first filter disposed between the dichroic mirror and the first detector, the first filter being configured to allow light ranging from about 510 nm to about 570 nm to reach the first detector.* This aspect of the invention is clearly disclosed in paragraph [0023].

While filters are well known in the art, the cited art provides no basis for incorporating a filter having the recited parameters into Ogino's device, particularly filters uniquely configured to detect fluorescence from Acridine Orange, particularly where different portions of such fluorescence are detected in two different detectors.

Basically, the prior art and the knowledge generally available in the art does not appear to suggest that any benefit could be obtained by using two different detectors to acquire data corresponding to stimulated light, thus filtering stimulated light before it is acquired by a detector does not appear to represent an obvious modification to Ogino's technology.

Patentability of New Claim 57

New Claim 57 is dependent upon new Claim 51, and is patentable for at least the same reasons. Claim 57 further recites *wherein the second detector includes an infrared filter configured to allow light below about 680 nm to pass through the infrared filter, and further comprising a second filter disposed between the dichroic mirror and the second detector, the second filter being configured to allow light above about 590 nm to pass through the second filter, the infrared filter and the second filter in combination allowing light ranging from about 590 nm to about 680 nm to reach the second detector.* This aspect of the invention is clearly disclosed in paragraph [0023].

While filters are well known in the art, the cited art provides no basis for incorporating a filter having the recited parameters into Ogino's device, particularly filters uniquely configured to detect fluorescence from Acridine Orange, particularly where different portions of such fluorescence are detected in two different detectors.

Basically, the prior art and the knowledge generally available in the art does not appear to suggest that any benefit could be obtained by using two different detectors to acquire data

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corresponding to stimulated light, thus filtering stimulated light before it is acquired by a detector does not appear to represent an obvious modification to Ogino's technology.

In consideration of the amendment to the claims and the Remarks set forth above, it is applicants' position that all claims in the current application are patentable over the art of record. The Examiner is thus requested to pass this case to issue without further delay. In the event that any other issues remain, the Examiner is invited to telephone applicants' attorney at the number listed below.

Respectfully submitted,

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